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ABSTRACT

The status of teacher certification practices and metrication programs at the State Department of Education level are reported. A survey was made of the plans, developments, goals, and projected metrication needs of personnel charged with preparing the public school population for life with the metric system. Nine categories were assessed by specific questionnaire items. Responding were 66 state supervisors, representing 42 states, the District of Columbia, and two territories. Among the findings: (1) 88% indicated there are presently no metric competency statements in teacher certification regulations; (2) 95% declared their region has commenced formal planning for implementing the metric system; (3) only 33% felt metric changeover could be accomplished by the end of 1980; and (4) 25% felt the role of the Federal government has been minimal. The document states that two issues must be resolved: (1) agreement on metric competencies to be developed in the teaching population, and (2) operational definitions of competency in the metric system. (MP)

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Preparation for Metric Changeover in State Departments of Education: A Nationwide Survey

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Overview

As one journeys around the world, the commonality of the Metric System is evident in the industrialized nations. In those countries not yet committed to the use of metrics, the majority have a more or less unified and coordinated plan for conversion to the Metric System within a specified time period. Though progress is slow, the United States became committed to metric conversion with legislation signed by President Ford in 1975; this legislation does not, however, specify a target date for changeover.

Since the signing of this legislation, one is reminded of the every day changes in the way we measure things that will be affected by the coming of the International System (SI) of metric weights and measure. The weather reports in the media are given in both the Fahrenheit and Celsius temperature scales. A glance at the dual speedometer in your new car convinces you that you are moving too slowly until you realize that you're reading the kilometre per hour scale instead of the miles per hour scale. A "quart" bottle of soda is labeled 33.8 fl.oz. or 1 liter. The box of cereal you purchase is labeled 1 lb. 2 oz. or 510 grams. It has become apparent that many products in our environment

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are now measured in this standard English system and the internationally accepted Metric System.

Leaders at the national level have been cautious in their efforts to facilitate the changeover to the Metric System. It appears in some quarters that the impetus is shifting from cautious support to public endorsement as the concept of interdependence becomes an increasingly reality to the American people. There are also indications that an anti-metric movement, similar to those experienced by major countries who recently converted (Australia, Great Britain, Canada) is gaining some momentum in the United States. Early in 1978 the final appointments were made to fill the National Metric Advisory Board which was established in the 1975 legislation. Three major rounds of federal funding have been targeted for metric training of the public with emphasis on school personnel.

One project that has resulted from recent federal funding is IMPACT I (Instruction in Measurement Processes for Action Classroom Teaching; Szabo, Trueblood, & Nippes, 1977) conceived and developed by Michael Szabo and Cecil R. Trueblood at The Pennsylvania State University. This program has clearly demonstrated the feasibility of training leadership teams in metric competencies; these teams then disseminate this knowledge to teachers in local school districts as well as business and industrial representatives. The teams represent a critical mass of articulate professional in the classrooms to maximize the efficience of the metric conversion process, as demonstrated by the follow-on (IMPACT II) in which three school districts in Pennsylvania have completed district-wide training and multi-year metric planning (Trueblood, Szabo, & Smith, 1978). These are just a few examples of the many successful programs that have resulted from the Federal commitment to prepare the nation for Metric changeover.

Rationale

The ramifications of metric conversion are gradually becoming cognizant to many Americans. The change to the Metric System will affect all of us in our daily lives as evidenced by the examples cited above. The biggest burden for metric conversion will fall on the public and vocational schools. The day is rapidly approaching when graduates of our schools will be required to demonstrate their ability to deal competently with the International System of Weights and Measures (SI).

Both the changeover to metric and metrics itself will necessitate a re-evaluation of existing curricular content and requirements of teacher education programs throughout the nation. State certification procedures for pre-service teachers will need to be modified. Instructional programs or curricula for training teachers to learn metric competencies and teach the Metric System to inservice teachers need to be developed if teachers are to effectively prepare their students for dealing with the changeover. State Departments of Education will be expected to exert strong leadership in the changeover efforts.

There is a need to reassess the current status of metric education at the State level to ascertain how metric changeover is being approached throughout the nation. The Northeast Metric Education Consortium commissioned the prime authors to conduct a survey to study the status of metric conversion throughout the United States. A description of the present survey, its methodology and findings is the major goal of this paper. The interested reader can make a comparison with similar data collected in 1975 by referring to Szabo, Trueblood, and Shockley, 1975.

Purpose of the Survey

The purpose of this survey was to determine the current status of teacher certification practices and metrication programs at the State Department of Education level. In order to accomplish goal, it is necessary to ascertain a perspective of current preparations, either in the planning or operational phases, as they relate to metrication at the State level.

Specifically, an assessment was made of the plans, developments, goals, and projected metrication needs of metric personnel in State and Territorial Departments of Education (SDE) who are charged with preparing the public school porulation for the life with the Metric System. Supervisors were surveyed vis-a-vis:

1) teacher certification practices,
2) metric competencies and the nature of their acquisition,
3) the status of metric legislation and related conversion plans,
4) budgetary needs to accomplish intended goals,
5) status of metric legislation,
6) the status of curricular and teacher training programs,
7) status of teacher training programs,
8) exemplary metric programs, and
9) the role of the Federal government in the metrication process.

Survey Methodology

After a comprehensive search of the literature on the Metric System in the United States, a survey questionnaire was formulated.

The survey was targeted to elicit answers to relevant questions regarding the educational status of metric changeover in the United States as presently constituted at the SDE level. The above nine categories are assessed by specific questionnaire items. The number and title of these categories, corresponding questionnaire items, and Table numbers are presented below in Table 1.

Table 1

List of Category Titles, Questionnaire Numbers, and Tables in Which Responses are Summarized

Category	Title	Questionnaire Items	Table
1	Teacher certification practices	1	2
2	Metric competencies and pre-service teachers	2,3,4	3
3	Status of metric conversion	5,6,7,8	4
4	Budgetary needs	9	5
5	Status of metric legislation	10	6
6	Student curricular development	11	7
7	In-service training programs	12,13	8
8	Exemplary programs	14	9
9	Federal role	15,16,17	10

The survey was sent to the science or mathematics supervisors for each SDE in the fifty states, the American Samoa, and the Virgin Islands during the Spring of 1977. The survey was sanctioned by The Executive Board of the Council of State Science Supervisors.

Responses were received from 66 supervisors in 42 states, the District of Comumbia, American Samoa, and the Virgin Islands. To facilitate reporting a numerical code was assigned to each state and territory (See Appendix A). In some cases, both the mathematics and science supervisor for a given state returned questionnaires. In other states, only one supervisor completed a questionnaire. Respondents included 35 mathematics and science supervisors and 31 supervisors who headed either the mathematics or science departments.

Findings

A total of 66 state supervisors, representing 42 states, the District of Columbia and two territories responded (85% return rate). Some states had two supervisors, one science and one mathematics, others had only one. The responses to the questionnaire are presented in Tables 2 through 10 (See Appendix B). Each Table presents responses within a specific category listed above (Table 2 contains responses to Category 1, teacher certification practices, etc.).

The title for each Table includes the question presented to the respondent. From left to right the columns in Tables 2-10 represent: (1) the specific response options for that item, (2) the number of responses and percentage figure for math and science supervisors for each response option, (3) the frequency and percentage figure for math and science supervisors for each response option, and (4) the frequency and percentage figure for each responce option for all groups combined.

The responses are identified by the State code number (See Appendix B). For example, in Table 2, item 1, the math and science supervisor for the State of Arizona (number 3) chose option B while a specific coordinator from Arizona also responded selecting response option B. The results of the item analysis along with a discussion of responses to each item, are presented below. Responses by State are also presented where they add immeasurably to the interpretation of the data.

Category 1, Teacher Certification Practices

Item 1, How are teachers certified in your state? Table 2 contains a synthesis of all responses by state supervisors to this item. The data indicate that only two states have teacher certification standards related to

metric competencies, and for Utah this does not take effect until 1980. Supervisors from Florida, Louisiana and Tennessee stated that the concept was under study. The supervisors in New Mexico and the American Samoa reported the concept is under development. The remaining 58 (88%) state supervisors responded that no specific standard presently exists or they are unaware of any.

Category 2, Metric Competencies and Preservice Teachers

Item 2, Separate metric competencies should be part of state teacher certification requirements. Table 3, contains the combined responses of mathematics and science supervisors, by state, to item 2. Twenty-nine (44%) of the supervisors either strongly agree or agree that separate metric competency statements should be made part of the required standards for teacher certification in their state. Twelve (18%) are undecided, while 25 (38%) either disagree or strongly disagree.

Item 3, Predominant way metric competencies should be acquired by preservice teachers. Table 3, contains the combined responses of mathematics and science supervisors, by state, to item 3. Seven (11%) state supervisors indicated that metric competencies should be acquired by preservice teachers through a special metric course. Twenty-three (35%) supervisors chose the option that metric competencies should be taught in specific modules in undergraduate methods courses, while 16 (24%) concur that these modules should be taught in undergraduate content courses. Four (6%) supervisors feel that preservice teachers should acquire metric competencies through competency based modules offered by a local education agency.

Twelve (18%) of the supervisors responded to the choice "other." A content analysis of the written responses to this item shows that most of the supervisors agree that metric competencies should be acquired by preservice teachers through some combination of the options presented. Three of

the supervisors suggest integrating the metric system within undergraduate courses.

Item 4, Predominant way metric competencies are presently acquired by preservice teachers. As depicted in Table 3, in four states (6%) metric competencies are acquired by preservice teachers through a special metric course. Thirty-eight (57%) of the supervisors indicated that metric competencies are taught through modules in either methods or content courses. Two (3%) supervisors purported that preservice teachers are taught metric competencies through competency based modules offered by a local educational agency. Fifteen (23%) of the supervisors indicated that no instruction is available at the present time.

Category 3, Status of Metric Conversion

Item 5, When did your department or division begin formal planning for conversion to the Metric System? Table 4, contains the combined supervisor's responses, by state, to item 5. The data reported in Table 3 presents a positive position of the state supervisors in reference to planning for metric conversion. Fifty-two (80%) state supervisors have initiated formal planning for metric conversion prior to President Ford's signing of the metric legislation in 1975. Eleven (17%) supervisors have commenced formal planning since the federal initiative, and only three (5%) of all state supervisors have made no formal commitment to planning for the inevitable changeover to the metric system.

Item 6, When do you anticipate full metric conversion in your state's elementary and secondary schools? Table 4, synthesizes the combined supervisor's responses by state, to item 6. The optimistic image established in the previous item does not appear to carry over to this item. Fifty-two (80%) state supervisors initiated formal planning prior to 1975, but only twenty-

two (33%) supervisors feel the fruition of this planning will culminate in a viable metric program in the schools prior to the 1981 calendar year. It appears that some supervisors underestimated the enormity of the task to plan and initiate a total metric changeover program. Thirty-eight (58%) state supervisors indicated that full metric conversion in the state's schools will not be a reality until the calendar year 1981 or after.

Item 7, Approximately how many people are employed for the purpose of metric changeover in your State Department of Education? Table 4, contains the responses of the combined supervisors, by state, to item 7. The data provided by the respondents may explicate a possible reason for the delay in metric conversion. Ten (16%) state supervisors indicated they have at least one person working full-time on metric preparations. Twenty-two (33%) supervisors indicated they have one person working part-time on metric changeover projects. Thirty-one (47%) supervisors responded that no one is explicitly employed to work on metric changeover. This lack of expert employees working on metric changeover poses a plausible explanation for why so many states do not anticipate having a viable metric program in their schools until 1981 or after.

Item 8, Approximately what percent of the school districts in your state have converted their curriculum to the Metric System? Table 4, presents the responses of the combined supervisors, by state, to item 8. Four (6%) state supervisors responded that at least 76% of the school districts with their states had converted their curriculum to the Metric System. Ten (15%) supervisors indicated that at least 51% of the districts had made the conversion. Thirty-one (47%) supervisors responded that less than 51% of the districts had made the transition. Fourteen (21%) of all supervisors responding indicated that no school district had made the changeover

to the Metric System.

Category 4. Budgetary Needs

Item 9, What size budget would your department or division need to mount a teacher/training curriculum development effort to effect conversion in grades K-adult? Table 5, contains the combined supervisor's responses, by state, to item 9. Thirty-seven (56%) state supervisors estimated they can accomplish the goal of metric changeover on a total budget of $400,000 or less. Seventeen (26%) supervisors indicated they require budgets ranging between $400,000 and 1.2 million dollars to accomplish the task. Seven (11%) state supervisors indicated the task will require budgets ranging between 1.6 and 2 million dollars to achieve complete conversion. The current status in preparation in the respective states, the number of districts who have already converted their curriculum, and the density of population of the state all have a direct bearing on the determination of these budgetary needs.

Category 5. Status of Metric Legislation

Item 10, What is the status of legislation in your state regulating or scheduling when metric conversion should be completed? Table 6, presents a pessimistic view regarding the status of metric legislation. Legislators in only five (8%) states have mustered enough votes to pass metric enabling legislation. Unfortunately no state has passed a funding bill to implement the provisions of the enabling legislation. The data also indicate that five (8%) state supervisors responded that their state has metric conversion legislation pending. Fifty-one (77%) state supervisors indicated that no legislation action is taking place in their state.

Category 5. Student Curricular Development

Item 11, Does your State Department of Education have completed or under

development curriculum materials or guides regarding learning of the metric system by students? Table 7, contains the combined supervisors' responses, by state, to item 11. Thirty (45%) state supervisors responded positively that their state or territory has under development or completed curriculum materials directed toward learning of the metric system by students. Seventeen (26%) supervisors indicated their states have such curriculum materials in the planning or development stage. Seventeen (26%) supervisors responded in the negative that no such curricular materials have been initiated at the present time.

Category 7. Inservice Teacher Training Programs

Item 12, Does your State Department of Education have instructional programs or curricula for training teachers to teach the metric system? Table 8, presents the responses of the combined state supervisors to item 12. The responses to this item indicate that supervisors in SDE's perceive the development of instructional materials for teachers as a priority concern. Forty-three (65%) state supervisors responded that instructional programs or curricula for training teachers to teach the metric system are in existence in their respective states and territories. Thirteen (20%) indicated that such materials are currently in the planning stage or under development. Only nine (14%) supervisors responded negatively to this item.

Item 13, Does your State Department of Education have instructional programs or curricula for training teachers to learn the metric system? The data presented in this table can be interpreted as presenting a positive picture of how supervisors perceive the need to develop programs to aid teachers in the comprehension and utilization of the metric system. Thirty-nine (59%) supervisors responded that such programs or curricula currently exist in their respective states. Thirteen (20%) indicated that such materials are in the

planning or development stage. Only seven states, plus the District of Columbia indicated that planning of such materials had not been initiated.

Category 8. Exemplary Metric Programs

Item 14, Are there any exemplary metric education programs presently operating in your state? Table 9, contains the combined supervisors responses, by state, to item 14. The data demonstrates that the states and territories are about equally divided on this item. Twenty-eight (42%) supervisors know of at least one exemplary metric program within their state. Thirty-three (50%) supervisors responded negatively or that they are unaware of any outstanding examples of metric programs in operation.

Category 9. Federal Role

Item 15, The federal funds spent on metric education have had a major impact on the metric changeover plans and progress in the public schools of my state? Table 10, contains the combined supervisors' responses, by state, to item 15. Thirty-six (55%) supervisors agreed or strongly agreed that federal funds have had a paramount role in metric changeover plans and progress in the public schools of their state. Twelve (18%) supervisors were unable to determine the degree of influence that federal funds have had in their state or territory. Sixteen (25%) supervisors either disagreed or strongly disagreed that federal funds have had any impact on metric changeover developments or progress within the public schools of their territory or state.

Item 16, Most school districts in my state need to have a deadline established at the federal level before metric conversion will occur? Thirty-three (50%) supervisors expressed a positive preference toward the federal government establishing a national time schedule for when metric conversion should be a reality. Twenty-four (37%) supervisors adopted an opposite view that such decisions should remain within the domain of the state's decision-making

powers. Nine (14%) supervisors were unable to determine their preference of the federal government role in setting a national time schedule to be imposed upon all the states and territories.

Item 17, On the average, what level of funding for metric changeover has your state provided to individual school districts through ESEA Title IVc? Ten (15%) state supervisors indicated their development had channelled ESEA Title IVc funds, ranging between $21,000 and $40,000, among the districts requesting funds for development and implementation of metric changeover programs. Six (9%) supervisors indicated the average figure spread among the districts in their states was between $10,000 and $20,000. Twenty (30%) supervisors indicated they had dispensed less than $10,000 totally to individual school districts. Twenty-one (32%) supervisors responded that no funds from this federal source had been disseminated to individual school districts for the purpose of contributing to the development or implementation of any metric changeover program.

Summary

The purpose of the present survey was to assess the status of metric changeover preparations initiated at the State Department of Education level. The results have highlighted areas of considerable progress and areas where progress has been diminutive in light of the period of time that has elapsed since the passage of the national metric legislation.

Eighty-eight percent of the respondents declared there are presently no metric competency statements in teacher certification regulations. This is surprising in light of the impetus that the Competency Based Teacher Education movement has gathered in the last five years.

In response to questions dealing with how competency acquisition should

be handled vs. how it is handled, there was strong agreement that undergraduate methods and/or content courses should carry the burden for metric training of preservice teachers. In reference to the status of metric changeover preparation, the progress is mixed. Ninety-five percent of all supervisors indicated their state or territory have commenced formal planning for the purpose of implementing the metric system. This optimistic sign must be coupled with the fact that only 33% of the supervisors feel the goal of metric changeover can be accomplished by the end of the calendar year 1980, even though 58% of the supervisors had initiated planning prior to 1975.

The delay can be partially explained by the report that only ten supervisors have at least one full-time employee working on metric changeover programs while 31 supervisors have no one explicity employed to work in this domain.

School districts in many states are converting their curricula to the metric system. Fourteen (21%) supervisors indicated that over 50% of the districts in their states and territories had converted their curriculums. An equal number of supervisors responded that no district had made the transition. This data presents a positive image in that the majority of the states have school districts demonstrating leadership in developing their own metric programs to meet the particular needs in that community.

Budgetary needs vary among the states and territories, but the majority of the supervisors feel they can develop the necessary programs to achieve metric changeover with a budget of $400,000 or less.

The status of metric legislation and funding bills for metric programs elicits an ominous future for metric changeover. Only five states have passed metric enabling legislation and no supervisor reported the passage of a metric funding bill. The fact that only five other states have legislation pending indicates that legislators are cognizant of the polarization that exists with-

in our society in regards to conversion to the metric system.

Supervisors in the states and territories have responded by developing curricular materials which they perceive as the greatest need of educators who face the burden of implementing metric changeover. More than 70% of all supervisors responding indicated they have curricula for students and programs for preparing teachers to teach and learn the metric system either under development or completed.

As previously noted, many states have school districts that have instituted the metric system into their curricula. Many of these efforts have developed into exemplary programs as reported by the supervisors in the respective State Departments of Education.

The final point highlighted by this survey is the role of the Federal government in aiding the implementation of the metric system. The issue of State's Rights is clearly evident in the responses to these questions dealing with the role of the Federal government. Over one half of the supervisors agreed or strongly agreed that federal funds have played a paramount role in the creation and development of metric changeover preparations. This is reflected in their use of ESEA Title IVc funds to aid school districts in developing curricular materials for implementing metric changeover. One-fourth of the supervisors expressed a position that the role of the Federal government has been minimal.

Thirty-three (50%) supervisors are in agreement that the Federal government should establish a time schedule for metric conversion to become a reality. Leadership by federal officials in this domain would provide tremendous impetus to the metric changeover process. Twenty-four (37%) supervisors assumed a unified position opposed to any federal guidelines or prouncements establishing deadlines for completion of metric changeover. This dichotomy reflects the

polarization that exists within our society over the issue of the metric system.

In conclusion, it appears that the states and the Federal government are moving in a positive direction toward metric conversion. There is opposition to the changeover, but it appears that most states are coping with the sources of conflict and are planning to complete metric changeover early in the 1980's. This time schedule could be accelerated depending on the leadership role assumed by the Federal government.

The priority given by the Carter administration to metric changeover will have a paramount influence on metric conversion. If inflation continues to be a plaguing issue, then metric changeover may not receive the impetus necessary to achieve a complete changeover by the early 1980's. The pace of metric changeover will probably be determined by the Metric Conversion Board recently confirmed by President Carter. There are other plausible events that can be cited to explain what has happened or predict what will happen. The purpose of this article is to elucidate the status of metric preparations at the SDE level; these other influences were not pursued.

Two issues must be resolved along the way. First, widespread and general agreement should be established regarding what metric competencies are to be developed in the teaching population. At present, there is little research of an empirical or theoretical basis to answer the questions which are the basis for competency determination.

Secondly, there are no operational definitions of what it means to be a student competent in the metric system. As educators, we have little idea of what our students know or do not know about SI. If this trend continues, we'll never know whether metric changeover has or has

not been achieved. These two issues support the recommendation that a portion of future federal funding be directed toward research on learning the metrics.

Appendix A

Numerical Code for States and Territories

Numerical Code	State or Territory	Numerical Code	State or Territory
1	Alabama	26	Missouri
2	Alaska	27	Montana
4	Arkansas	29	Nevada
5	California	30	New Hampshire
7	Connecticut	33	New York
8	Delaware	34	North Carolina
9	District of Columbia	35	North Dakota
10	Florida	37	Oklahoma
11	Georgia	38	Oregon
12	Hawaii	39	Pennsylvania
13	Idaho	41	South Carolina
14	Illinois	42	South Dakota
16	Iowa	43	Tennessee
18	Kentucky	44	Texas
20	Maine	45	Utah
21	Maryland	47	Virginia
22	Massachusetts	48	Washington
23	Michigan	50	Wisconsin
24	Minnesota	52	American Samoa
25	Mississippi	53	Virgin Islands

Appendix B

Items and Responses to Questions 1-17 as Presented in Tables 2-10

Table 2

Responses by Subgroups to Item 1.
Is there presently a teacher certification standard specifically related to metric competencies in your state?

Response Options	Subgroups						A & B Combined	
	A Math & Science			B Math or Science				
	N	%	State Code	N	%	State Code	N	%
A. Yes	1	3	(45)	1	3	(49)	2	3
B. No	29	83	(1,1,2,3,4, 8,14,16,18, 20,20,21,22, 23,24,27,29, 30,33,34,35, 37,38,39,41, 42,44,47,53)	27	87	(2,3,5,7,8, 9,11,12,13, 14,18,21,23, 24,26,29,30, 33,34,38,44, 45,46,47,48, 50,50)	56	85
C. This concept is under study	3	9	(10,19,43)	0			3	5
D. This concept is under development	1	3	(52)	2	6	(32,52)	3	5
E. I am not aware of any.	1	3	(25)	1	3	(39)	2	3
Omit	0			0			0	
Totals	35	53		31	47		66	101

Table 3

Responses by Subgroups to Item 2.
"I feel that separate metric competency statements should be made part of the required standards for teacher certification for my State.

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. Strongly Agree	4	11	(1,1,22,45)	6	19	(5,14,32,39, 46,49)	10	15
B. Agree	11	31	(8,18,19,20, 20,24,29,34, 39,43,44)	8	26	(2,13,21,29, 30,33,38,47)	19	29
C. Undecided	6	17	(2,4,14,16, 52,53)	6	19	(9,23,24,34, 44,52)	12	18
D. Disagree	10	29	(3,23,25,27, 30,33,35,37, 42,47)	9	29	(3,7,8,18,26, 45,48,50,50)	19	29
E. Strongly Disagree	4	11	(10,21,38,41)	2	6	(11,12)	6	9
Omit	0			0			0	
Totals	35	53		31	47		66	100

Table 3 continued

Responses by Subgroups to Item 3.
What is the predominant way in which metric measurement competencies should be acquired by pre-service teachers?

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. By completing a special metric course.	6	17	(1,14,20,25, 27,53)	1	3	(39)	7	11
B. By completing specific modules within undergraduate methods courses.	13	37	(3,8,8,16, 19,23,24,29, 34,35,44,45, 52)	10	32	(3,7,8,18, 24,29,32,49, 50,52)	23	35
C. By completing specific modules within content courses.	4	11	(1,20,21,33)	12	39	(2,11,12,13, 21,23,30,34, 38,45,46,48)	16	24
D. By completing competency based modules offered by a local education agency.	1	3	(10)	3	10	(5,14,47)	4	6
E. Other	9	26	(2,22,30,37, 38,41,42,43, 47)	3	10	(9,33,50)	12	18
Omit	2	6	(4,39)	2	6	(26,44)	4	6
Totals	35	53		31	47		66	100

Table 3 continued

Responses by Subgroups to Item 4.
What is the predominant way in which metric measurement competencies are now acquired by pre-service teachers in your State?

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. By completing a special metric course.	3	9	(20,25,35)	1	3	(3)	4	6
B. By completing specific modules within undergraduate methods courses.	12	34	(3,8,16,18, 24,27,30,37, 41,44,45,52)	8	26	(5,7,13,14, 48,49,50,52)	20	30
C. By completing specific modules within content courses.	8	23	(1,19,20,21, 33,34,38,42)	10	32	(12,21,23,24, 34,38,44,45, 47,50)	18	27
D. By completing competency based modules offered by a local education agency.	2	6	(4,23)	0			2	3
E. No instruction is offered at the present time.	5	14	(1,10,29,43, 53)	10	32	(2,8,9,11,18, 29,30,32,33,46)	15	23
Omit	5	14	(2,14,22,39, 47)	2	6	(26,39)	7	11
Totals	35	53		31	47		66	100

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Table 4

Responses by Subgroups to Item 5.
When did your Department or Division begin formal planning for conversion to the metric system?

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. Haven't begun yet	2	6	(2,18)	1	3	(9)	3	5
B. 1975 - present	6	17	(16,17,29,47, 52,53)	5	16	(11,14,29,50, 52)	11	17
C. 1973-74	25	71	(1,1,3,4,8, 10,14,19,20, 21,22,23,24, 25,30,33,35, 37,38,39,41, 42,43,44,45)	18	58	(3,13,18,21, 23,24,26,30, 32,33,34,38, 39,45,46,48, 49,50)	43	65
D. 1971-72	2	6	(20,34)	3	10	(5,7,8)	5	8
E. Before 1971	0			3	10	(12,44,47)	3	5
Omit	0			1	3	(2)	1	2
Totals	35	53		31	47		66	102

Table 4 continued

Responses by Subgroups to Item 6.
When do you anticipate full metric conversion in your State's elementary and secondary schools?

Response Options	A Math & Science N	A Math & Science %	A Math & Science State Code	B Math or Science N	B Math or Science %	B Math or Science State Code	A & B Combined N	A & B Combined %
A. During calendar year 1977	0			0			0	
B. During calendar year 1978	0			0			0	
C. During calendar year 1979	0			2	6	(5,7)	2	3
D. During calendar year 1980	12	34	(3,8,10,14, 20,20,21,22, 23,27,45,52)	8	26	(8,14,18,24, 32,45,49,52)	20	30
E. After calendar year 1980	19	54	(4,16,18,19, 24,25,29,30, 33,34,35,37, 38,39,41,42, 43,44,47)	19	61	(3,9,11,13,21, 23,26,29,30,33, 34,38,39,44,46, 47,48,50,50)	38	58
Omit	4	11	(1,1,2,53)	2	6	(2,12)	6	9
Totals	35	53		31	47		66	100

Table 4 continued

Responses by Subgroups to Item 7.
Approximately how many people are employed for the purpose of metric changeover in your State Department of Education

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. 1 person(equivalents), more than full time	2	6	(3,19)	5	16	(5,8,23,34,52)	7	11
B. 1 person (equivalents), full time	2	6	(1,34)	1	3	(24)	3	5
C. 1 person (equivalents), less than full time	11	31	(4,8,14,16, 20,20,22,29, 35,39,53)	11	35	(3,7,14,21, 29,33,39,44, 45,47,48)	22	33
D. No one explicitly employed for this purpose	18	51	(1,10,18,23, 24,25,27,30, 33,37,38,41, 42,43,44,45, 47,52)	13	42	(9,11,12,13, 18,26,30,32, 38,46,49,50, 50)	31	47
Omit	1	3	(21)	0			1	2
Omit	1	3	(2)	1	3	(2)	2	3
Totals	35	53		31	47		66	101

Table 4 continued

Responses by Subgroups to Item 8.
Approximately what percent of the school districts in your state have converted their curriculum to the metric system?

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. None	7	20	(1,29,33,34, 43,45,52)	7	23	(11,13,29,34, 44,47,48)	14	21
B. At least 25%	13	37	(3,14,16,18, 22,23,25,27, 30,37,39,42, 47)	11	35	(14,18,21,23, 30,32,38,45, 46,50,50)	24	36
C. 26% - 50%	4	11	(20,35,38,53)	3	10	(3,24,39)	7	11
D. 51% - 75%	6	17	(8,19,20,21, 41,44)	4	13	(5,8,33,52)	10	15
E. 76% - 100%	3	9	(4,10,24)	1	3	(7)	4	6
Omit	2	6	(1,2)	5	16	(2,9,12,26,49)	7	11
Totals	35	53		31	47		66	100

Table 5

Responses by Subgroups to Item 9.
What size budget would your department or division need to mount a teacher training/curriculum development effort to effect metric conversion in grades K-adult? (Assume starting from zero programs.)

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. $1,600,000 - 2,000,000	2	6	(14,25)	4	13	(11,14,23,33)	6	9
B. $1,200,000 - 1,600,000	1	3	(27)	0			1	2
C. $ 800,000 - 1,200,000	2	6	(16,39)	4	13	(34,38,44,45)	6	9
D. $ 400,000 - 800,000	6	17	(18,19,37,43, 45,47)	5	16	(5,18,39,48, 50)	11	17
E. $ 0 - 400,000	22	63	(1,1,3,4,8, 20,20,21,22, 23,24,29,30, 33,34,35,38, 41,42,44,52, 53)	15	48	(2,3,7,8,9, 12,13,29,30, 32,46,47,49, 50,52)	37	56
Omit	2	6	(2,10)	3	10	(21,24,26)	5	8
Totals	35	53		31	47		66	101

Table 6

Responses by Subgroups to Item 10.
What is the status of legislation in your State regulating or scheduling when metric conversion should be completed?

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. Metric conversion bill passed	3	9	(10,19,24)	2	6	(23,44)	5	8
B. Metric conversion and funding bill passed	0			0			0	
C. Metric conversion legislation now pending	3	9	(22,25,41)	2	6	(5,50)	5	8
D. No legislative action taking place	27	77	(1,1,4,8,14, 16,18,20,20, 21,23,27,29, 30,33,34,35, 37,38,39,42, 43,44,45,47, 52,53)	24	77	(3,7,8,9,11, 13,14,18,21, 26,29,30,32, 33,34,38,39,45, 46,47,48,49, 50,52)	51	77
Omit	1	3	(3)	0			1	2
Omit	1	3	(2)	3	10	(2,12,24)	4	6
Totals	35	53		31	47		66	101

Table 7

Responses by Subgroups to Item 11.
Does your State Department of Education have completed or under development curriculum materials or guides regarding learning of the metric system by students?

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. Yes	13	37	(1,4,19,20, 20,23,25,29, 35,37,38,44, 52)	17	55	(3,5,12,14, 21,23,24,29, 34,38,39,44 46,47,50,50, 52)	30	45
B. No	10	29	(3,14,18,21, 24,27,33,34, 41,47)	7	23	(7,13,18,26, 32,33,45)	17	26
C. In planning stage	10	29	(1,8,10,16, 30,39,42,43, 45,53)	2	6	(8,30)	12	18
D. In development stage	1	3	(22)	4	13	(9,11,48,49)	5	8
Omit	0			0			0	
Omit	1	3	(2)	1	3	(2)	2	3
Totals	35	53		31	47		66	100

Table 8

Responses by Subgroups to Item 12.
Does your State Department of Education have instructional programs or curricula for training teachers to teach the metric system?

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. Yes	21	60	(1,3,4,8,19, 21,23,24,25, 29,30,33,34, 35,37,38,41, 44,45,47,52)	22	70	(3,5,8,12,13, 14,21,23,24, 29,30,32,33, 34,38,39,44, 45,46,47,49, 52)	43	65
B. No	4	11	(14,20,20,27)	5	16	(2,9,26,50,50)	9	14
C. In planning stage	7	20	(1,10,16,39, 42,43,53)	0			7	11
D. In development stage	2	6	(18,22)	4	13	(7,11,18,48)	6	9
Omit	0			0			0	
Omit	1	3	(2)	0			1	2
Totals	35	53		31	47		66	101

Table 8 continued

Responses by Subgroups to Item 13.
Does your State Department of Education have instructional programs or curricula for training teachers to learn the metric system?

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. Yes	20	57	(1,3,4,8,16, 21,23,24,29, 30,33,34,35, 37,38,41,42, 44,45,52)	19	61	(3,5,8,13,14, 18,21,23,24, 29,30,33,34, 38,39,45,47, 49,52)	39	59
B. No	4	11	(14,20,20,27)	6	19	(9,26,32,46, 50,50)	10	15
C. In planning stage	6	17	(1,10,25,39, 43,53)	1	3	(44)	7	11
D. In development stage	3	9	(18,19,22)	3	10	(7,12,48)	6	9
Omit	0			0			0	
Omit	2	6	(2,47)	2	6	(2,11)	4	6
Totals	35	53		31	47		66	100

Table 9

Responses by Subgroups to Item 14.
Are there any exemplary metric education programs presently operating in your state? (e.g., in public or private schools?)

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. Yes	15	43	(14,19,21,22, 24,25,27,33, 34,35,37,38, 41,45,47)	13	42	(3,7,14,23, 24,33,34,39, 46,47,48,49, 50)	28	42
B. No	7	20	(4,16,20,20, 29,30,52)	5	16	(29,30,38,44, 52)	12	18
C. I am not aware of any	10	29	(1,1,3,8,10, 18,23,42,43, 53)	11	35	(5,8,9,11,12, 13,18,21,32, 45,50)	21	32
Omit	0			0			0	
Omit	0			0			0	
Omit	3	9	(2,39,44)	2	6	(2,26)	5	8
Totals	35	53		31	47		66	102

Table 10

Responses by Subgroups to Item 15.
The federal funds spent on metric education have had a major impact on the metric changeover plans and progress in the public schools of my state.

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. Strongly Agree	11	31	(4,8,14,19, 22,24,25,34, 38,47,52)	6	19	(13,14,24, 34,39,52)	17	26
B. Agree	8	23	(3,16,23,27, 35,37,39,45)	11	35	(3,7,8,11, 12,23,30,32, 38,44,49)	19	29
C. Undecided	9	26	(1,1,21,29, 30,33,41,44, 53)	3	10	(5,29,45)	12	18
D. Disagree	3	9	(20,42,43)	6	19	(9,21,26,33, 47,48)	9	14
E. Strongly Disagree	3	9	(10,18,20)	4	13	(18,46,50,50)	7	11
Omit	1	3	(2)	1	3	(2)	2	3
Totals	35	53		31	47		66	101

Table 10 continued

Responses by Subgroups to Item 16.
Most school districts in my state need to have a deadline established at the federal level before metric conversion will occur

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. Strongly Agree	12	34	(1,1,2,10, 18,20,22,29, 37,39,43,52)	7	23	(13,24,29, 39,46,47,52)	19	29
B. Agree	5	14	(8,14,25,33, 38)	9	29	(2,5,8,9,18, 21,32,48,50)	14	21
C. Undecided	5	14	(16,19,24,35, 42)	4	13	(3,11,30,44)	9	14
D. Disagree	8	23	(3,20,21,23, 30,44,47,53)	9	29	(7,14,23,26, 33,34,38,49, 50)	17	26
E. Strongly Disagree	5	14	(4,27,34,41, 45)	2	6	(12,45)	7	11
Omit	0			0			0	
Totals	35	53		31	47		66	101

Table 10 continued

Responses by Subgroups to Item 17.
On the average, what level of funding for metric changeover has your state provided to individual school districts through ESEA Title IVc?

Response Options	Subgroups A Math & Science N	%	State Code	B Math or Science N	%	State Code	A & B Combined N	%
A. None	13	37	(1,3,4,18, 20,21,23, 24,29,41, 44,45,47)	8	26	(14,18,32,34, 38,44,49,50)	21	32
B. Below $10,000	11	31	(8,16,19,20, 25,27,35,38, 39,42,43)	9	29	(3,9,13,21, 29,33,46,47, 50)	20	30
C. $10,000 - $20,000	2	6	(14,53)	4	13	(7,30,39,48)	6	9
D. $21,000 - $30,000	4	11	(22,30,37,52)	2	6	(8,52)	6	9
E. $31,000 - $40,000	3	9	(1,33,34)	1	3	(23)	4	6
Omit	2	6	(2,10)	7	23	(2,5,11,12, 24,26,45)	9	14
Totals	35	53		31	47		66	100